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## GRADATION FOR WMM
## (As per MORT&H 400-11)

| | | |
|---|---|---|
| Name of Work | : | Improvements to drains and footpath at Tatanagar from 5th cross to 7th cross and other roads in ward No. 08, Kodigehalli |
| Client | : | BRUHAT BANGALORE MAHANAGARA PALIKE |
| Consultant | : | M/s Tejus Consultants |
| Contractor | : | M/s KRIDL |
| Date of Testing | : | 24.04.2019 |
| Type of Mix | : | WMM |
| Sample ID | : | WMM 1 |

| | | | |
|---|---|---|---|
| Sample Location: | At plant | Date of Sampling: | 24.04.2019 |
| Type of material & Purpose: | WMM | Date of testing: | 24.04.2019 |
| | | Oven Dry Wt.(gms): | 10000.0 |

| IS Sieve size in mm | Weight retained (gm) | Cummulative weight retained (gm) | Cummulative % of retained | Cummulative % of passing | Specification limits |
|---|---|---|---|---|---|
| 53 | 0 | 0 | 0.00 | 100.00 | 100.00 |
| 45 | 372 | 372 | 3.72 | 96.28 | 95-100 |
| 22.4 | 2310 | 2682 | 26.82 | 73.18 | 60-80 |
| 11.2 | 1862 | 4544 | 45.44 | 54.56 | 40-60 |
| 4.75 | 1904 | 6448 | 64.48 | 35.52 | 25-40 |
| 2.36 | 1352 | 7800 | 78.00 | 22.00 | 15-30 |
| 0.6 | 1212 | 9012 | 90.12 | 9.88 | 8.0-22.0 |
| 0.075 | 864 | 9876 | 98.76 | 1.24 | 0-8 |
| Pan | 124 | | | | |
| Total | 10000 | | | | |

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## FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

| | |
|---|---|
| Project | Improvements to drains and footpath at Tatanagar from 5th cross to 7th cross and other roads in ward No. 08, Kodigehalli |
| Client | BRUHAT BANGALORE MAHANAGARA PALIKE |
| Consultant | M/s Tejus Consultants |
| Contractor | M/s KRIDL |

| | | | |
|---|---|---|---|
| Type of Material | WMM | Proposed Use | WMM |
| Sample Location | At plant | Date of Sampling | 24.04.2019 |
| | | Date of Testing | 24.04.2019 |

| Size of aggregate | | Flakiness Index | | Elongation Index | |
|---|---|---|---|---|---|
| Passing through IS sieve, mm | Retained on IS sieve, mm | Total wt. of aggregate retained on sieves (A) gms. | Wt. of aggregate passing from Flakiness gauge (B) gms | Wt. of aggregate retained on Flakiness gauge (C) gms | Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms |
| 63.0 | 50.0 | 0 | 0 | 0 | 0 |
| 50.0 | 40.0 | 0 | 0 | 0 | 0 |
| 40.0 | 31.5 | 0 | 0 | 0 | 0 |
| 31.5 | 25.0 | 0 | 0 | 0 | 0 |
| 25.0 | 20.0 | 0 | 0 | 0 | 0 |
| 20.0 | 16.0 | 915 | 84 | 831 | 62 |
| 16.0 | 12.5 | 1300 | 90 | 1210 | 120 |
| 12.5 | 10.0 | 490 | 84 | 406 | 68 |
| 10.0 | 6.3 | 560 | 72 | 488 | 46 |
| **Total** | | **3265** | **330** | **2935** | **296** |

**Note:** Minimum 200 Pcs should be taken on each fraction of test

| | | |
|---|---|---|
| Flakiness Index(%): | 10.11 | |
| Elongation Index(%): | 10.09 | |
| Combined FI+EL (%) | 20.19 | |

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## AGGREGATE IMPACT VALUE
## (IS: 2386 Part - 4)

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| | | | |
|---|---|---|---|
| | Improvements to drains and footpath at Tatanagar from 5th cross to 7th cross and other roads in ward No. 08, Kodigehalli | | |
| | BRUHAT BANGALORE MAHANAGARA PALIKE | | |
| | M/s Tejus Consultants | | |
| | M/s KRIDL | | |
| | WMM | **Date of Sampling** | **24.04.2019** |
| | **At plant** | **Date of Testing** | **24.04.2019** |

| Sl. No. | Description | | Test No. 1 | Test No. 2 | Test No. 3 | Spec Limit (%) |
|---|---|---|---|---|---|---|
| 1 | Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm) | (Wa) | 390.00 | 380.00 | 392.00 | |
| 2 | Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm) | (Wb) | 297.00 | 288.00 | 296.00 | |
| 3 | Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm) | (Wc) | 93.00 | 92.00 | 96.00 | |
| 4 | Aggregate Impact Value (%) | (Wc/Wa)* 100 | 23.85 | 24.21 | 24.49 | |
| 5 | Average Aggregate impact value | (%) | 24.18 | | | Max - 30 % |

Remarks : Satisfactory / Not Satisfactory

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| | |
|---|---|
| | Improvements to drains and footpath at Tatanagar from 5th cross to 7th cross and other roads in ward No. 08, Kodigehalli |
| | BRUHAT BANGALORE MAHANAGARA PALIKE |
| | M/s Tejus Consultants |
| | M/s KRIDL |

**Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)**

| | |
|---|---|
| Date of Testing | **25.04.2019** |
| Layer no. or level | WMM I layer |
| Depth of hole | 250mm |

| | 1 | 2 | 3 |
|---|---|---|---|
| Field density: | | | |
| Wt. of wet material from hole (Ww) gms. | 6542 | 6250 | 6560 |
| Wt. of sand+cylinder before pouring (w1) gms. | 14000 | 14000 | 14000 |
| Wt. of sand+cylinder after pouring (w2) gms. | 9582 | 9768 | 9572 |
| Wt. of sand in cone (w3) gms. | 832 | 810 | 838 |
| Wt. of sand in hole (w4)=(w1-w2-w3) gms. | 3586 | 3422 | 3590 |
| Bulk density of sand (γs)gm/cc | 1.32 | 1.32 | 1.32 |
| Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc | 2.41 | 2.41 | 2.41 |
| | | | |
| Moisture meter reading(moisture content) | 12.43 | 12.45 | 12.47 |
| | | | |
| Result | | | |
| FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc | 2.14 | 2.14 | 2.14 |
| MDD | 2.18 | 2.18 | 2.18 |
| OMC | 12.60% | 12.60% | 12.60% |
| % of Compaction Obtained | 98.25 | 98.35 | 98.38 |
| Compaction Required | 98% | 98% | 98% |

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## TEST REPORT

| | |
|---|---|
| Client: | Bruhath Bangalore Mahanagara Palike |
| Project: | Improvements to drains and footpath at Tatanagar from 5th cross to 7th cross and other roads in ward No. 08, Kodigehalli |
| Consultants: | TEJUS CONSULTANTS Basaveshwar Nagar Bangalore |
| Contractor: | M/s KRIDL |
| Mass Weight in gm: | 3000 |

## SIEVE ANALYSIS

| | | | |
|---|---|---|---|
| Type of Material | 40 mm down size | Proposed Use | PCC |
| Sample Location | At Site/Plant | Date of Sampling | 29.04.2019 |
| | | Date of Testing | 29.04.2019 |

| IS Sieve Size | Weight Retained in gm | Cum. Weight Retained in gm | Cumulative Weight Retained in % | Cumulative Weight Passing in % | Specific Limits as per IS 383-1970 (RA-2007) % of Passing For Graded Aggregate of Nominal Size |
|---|---|---|---|---|---|
| 80.00mm | 0 | 0 | 0.00 | 100.00 | 100 |
| 63.00mm | 0 | 0 | 0.00 | 100.00 | - |
| 40.00mm | 126 | 126 | 4.20 | 95.80 | 95-100 |
| 20.00mm | 1380 | 1506 | 50.20 | 49.80 | 30-70 |
| 10.00mm | 916 | 2422 | 80.73 | 19.27 | 10-35 |
| 4.75mm | 494 | 2916 | 97.20 | 2.80 | 0-5 |
| Pan | 84 | 3000 | 100.00 | 0.00 | |

Remarks : ✓ Satisfactory / Not Satisfactory

Note:
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3. Any Query regarding the report must be reported reported within 15days from the date of testing.

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## TEST REPORT

| | |
|---|---|
| Client: | Bruhath Bangalore Mahanagara Palike |
| Project: | Improvements to drains and footpath at Tatanagar from 5th cross to 7th cross and other roads in ward No. 08, Kodigehalli |
| Consultants: | TEJUS CONSULTANTS Basaveshwar Nagar Bangalore |
| Contractor: | M/s KRIDL |
| Total Weight in gm: | 3000 |

## SIEVE ANALYSIS

| | | | |
|---|---|---|---|
| Type of Material | 40 mm down size | Proposed Use | PCC |
| Sample Location | At Site/Plant | Date of Sampling | 29.04.2019 |
| | | Date of Testing | 29.04.2019 |

| IS Sieve Size | Weight Retained in gm | Cum. Weight Retained in gm | Cumulative Weight Retained in % | Cumulative Weight Passing in % | Specific Limits as per IS 383-1970 (RA-2007) % of Passing For Graded Aggregate of Nominal Size |
|---|---|---|---|---|---|
| 80.00mm | 0 | 0 | 0.00 | 100.00 | 100 |
| 63.00mm | 0 | 0 | 0.00 | 100.00 | - |
| 40.00mm | 122 | 122 | 4.07 | 95.93 | 95-100 |
| 20.00mm | 1370 | 1492 | 49.73 | 50.27 | 30-70 |
| 10.00mm | 912 | 2404 | 80.13 | 19.87 | 10-35 |
| 4.75mm | 494 | 2898 | 96.60 | 3.40 | 0-5 |
| Pan | 102 | 3000 | 100.00 | 0.00 | |

Remarks : Satisfactory / Not Satisfactory

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# TEST REPORT

| | |
|---|---|
| Client | Bruhat Bangalore Mahanagara Palike |
| Project | Improvements to drains and footpath at Tatanagar from 5th cross to 7th cross and other roads in ward No. 08, Kodigehalli |
| Consultants | Tejus Consultants, Bangalore |
| Contractor | M/s KRIDL |

## SIEVE ANALYSIS

| | | | |
|---|---|---|---|
| Total Weight: | 3000 gms | | |
| Type of Material | Fine aggregate (River Sand/ M sand) | Proposed Use | PCC FOR ROAD |
| Sample Location | At Site/Plant | Date of Sampling | 29.04.2019 |
| | | Date of Testing | 29.04.2019 |

| IS Sieve Size | Weight Retained | Cum. Weight Retained | Cum. % Retained | Cum. % Passing | Spec. Limit (%) Passing (Zone-II) |
|---|---|---|---|---|---|
| 10.00 mm | 0 | 0 | 0 | 100.00 | 100 |
| 4.75 mm | 220 | 220 | 7.33 | 92.67 | 90 - 100 |
| 2.36 mm | 312 | 532 | 17.73 | 82.27 | 75 - 100 |
| 1.18 mm | 305 | 837 | 27.90 | 72.10 | 55 - 90 |
| 0.600 mm | 472 | 1309 | 43.63 | 56.37 | 35 -59 |
| 0.300 mm | 820 | 2129 | 70.97 | 29.03 | 8-30 |
| 0.150 mm | 650 | 2779 | 92.63 | 7.37 | 0 - 10 |
| Pan | 221 | 3000 | | | - |
| | | | | | |

**Remarks :** ✓ Satisfactory / Not Satisfactory

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## TEST REPORT

| | |
|---|---|
| Client | BRUHAT BENGALORE MAHANAGARA PALIKE |
| Project | Improvements to drains and footpath at Tatanagar from 5th cross to 7th cross and other roads in ward No. 08, Kodigehalli |
| Consultants | TEJUS CONSULTANTS Basaveshwar Nagar Bangalore |
| Contractor | M/s KRIDL |

# SPECIFIC GRAVITY AND WATER ABSORPTION

## FINE AGGREGATE (IS-2386-PART-3)

| | | | |
|---|---|---|---|
| Type of Material | Fine aggregate (River Sand/ M sand) | Proposed Use | PCC FOR ROAD |
| Location/Source | At Site/Plant | Date of Sampling | 29.04.2019 |
| Period of Soaking | 24 hours | Date of Testing | 29.04.2019 |

| Sl. No. | Test Property | TRIAL - 1 | TRIAL - 2 | TRIAL - 3 | |
|---|---|---|---|---|---|
| A | Weight of sturated surface dry sample gm. | 662 | 638 | 687 | |
| B | Weight of oven - dry sample gm. | 654 | 628 | 676 | |
| C | Weight of Pycnometer Filled with water gm | 1275 | 1275 | 1275 | |
| D | Weight of Pycnometer + sample + water gm | 1692 | 1676 | 1707 | |
| E | Bulk specific gravity $\frac{B}{(C+A-D)}$ | 2.669 | 2.650 | 2.651 | 2.657 |
| G | Absorption (%) $\frac{(A-B)*100}{B}$ | 1.223 | 1.592 | 1.627 | 1.481 |

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## TEST REPORT

| | |
|---|---|
| Client | Bruhat Bangalore Mahanagara Palike |
| Project | Improvements to drains and footpath at Tatanagar from 5th cross to 7th cross and other roads in ward No. 08, Kodigehalli |
| Consultants | Tejus Consultants, Bangalore |
| Contractor | M/s KRIDL |

## SIEVE ANALYSIS

| | | | |
|---|---|---|---|
| Total Weight: | 3000 gms | | |
| Type of Material | Fine aggregate (River Sand/ M sand) | Proposed Use | PCC FOR ROAD |
| Sample Location | At Site/Plant | Date of Sampling | 29.04.2019 |
| | | Date of Testing | 29.04.2019 |

| IS Sieve Size | Weight Retained | Cum. Weight Retained | Cum. % Retained | Cum. % Passing | Spec. Limit (%) Passing (Zone-II) |
|---|---|---|---|---|---|
| 10.00 mm | 0 | 0 | 0 | 100.00 | 100 |
| 4.75 mm | 224 | 224 | 7.47 | 92.53 | 90 - 100 |
| 2.36 mm | 324 | 548 | 18.27 | 81.73 | 75 - 100 |
| 1.18 mm | 315 | 863 | 28.77 | 71.23 | 55 - 90 |
| 0.600 mm | 482 | 1345 | 44.83 | 55.17 | 35 -59 |
| 0.300 mm | 822 | 2167 | 72.23 | 27.77 | 8-30 |
| 0.150 mm | 650 | 2817 | 93.90 | 6.10 | 0 - 10 |
| Pan | 183 | 3000 | | | - |
| | | | | | |

**Remarks :** Satisfactory / Not Satisfactory

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## TEST REPORT

| | |
|---|---|
| Client | BRUHAT BENGALORE MAHANAGARA PALIKE |
| Project | Improvements to drains and footpath at Tatanagar from 5th cross to 7th cross and other roads in ward No. 08, Kodigehalli |
| Consultants | TEJUS CONSULTANTS Basaveshwar Nagar Bangalore |
| Contractor | M/s KRIDL |

# SPECIFIC GRAVITY AND WATER ABSORPTION

## FINE AGGREGATE (IS-2386-PART-3)

| | | | |
|---|---|---|---|
| Type of Material | Fine aggregate (River Sand/ M sand) | Proposed Use | PCC FOR ROAD |
| Location/Source | At Site/Plant | Date of Sampling | 29.04.2019 |
| Period of Soaking | 24 hours | Date of Testing | 29.04.2019 |

| SL No. | Test Property | | TRIAL - 1 | TRIAL - 2 | TRIAL - 3 | |
|---|---|---|---|---|---|---|
| A | Weight of sturated surface dry sample gm. | | 665 | 634 | 686 | |
| B | Weight of oven - dry sample gm. | | 654 | 626 | 676 | |
| C | Weight of Pycnometer Filled with water gm | | 1275 | 1275 | 1275 | |
| D | Weight of Pycnometer + sample + water gm | | 1694 | 1674 | 1706 | |
| E | Bulk specific gravity | $\frac{B}{(C+A-D)}$ | 2.659 | 2.664 | 2.651 | 2.658 |
| G | Absorption (%) | $\frac{(A-B)*100}{B}$ | 1.682 | 1.278 | 1.479 | 1.480 |

**Note:**

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## Test Report on Cement

| | |
|---|---|
| Project | Improvements to drains and footpath at Tatanagar from 5th cross to 7th cross and other roads in ward No. 08, Kodigehalli |
| Client | Bruhat Bangalore Mahanagar Palike |
| Consultant | TEJUS CONSULTANTS |
| Contractor | M/s KRIDL |
| Sample ID | Cement |
| Date of Sample Tested | 29.04.2019 |
| Sample Supplied By | Agency |

| Sl.No. | Descriptions | Test Method as per IS | Test Result | Requirements as per IS: 12269-1987 |
|---|---|---|---|---|
| 1 | a) Initial Setting Time | IS-4031 (Part-5) | 36 Minutes | Not Less than 30 Minutes |
| | b) Final Setting Time | IS-4031 (Part-5) | 350 Minutes | Not More than 600 Minutes |
| 2 | Soundness | IS-4031 (Part-3) By the Le-Chatelier method | 5mm | Not More than 10 mm |
| 3 | Standard Consistency | IS-4031 (Part-4) | 28.00% | 25 % to 35 |

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## Test Report on Cement

| | |
|---|---|
| Name of Work | Improvements to drains and footpath at Tatanagar from 5th cross to 7th cross and other roads in ward No. 08, Kodigehalli |
| Client | Bruhat Bangalore Mahanagar Palike |
| Consultant | TEJUS CONSULTANTS |
| Contractor | M/s KRIDL |
| Source of Sample | Cement |
| Date of Sample Tested | 29.04.2019 |
| Sample Submitted By | Agency |

| Sl.No. | Descriptions | Test Method as per IS | Test Result | Requirements as per IS: 12269-1987 |
|---|---|---|---|---|
| 1 | a) Initial Setting Time | IS-4031 (Part-5) | 40 Minutes | Not Less than 30 Minutes |
| | b) Final Setting Time | IS-4031 (Part-5) | 350 Minutes | Not More than 600 Minutes |
| 2 | Soundness | IS-4031 (Part-3) By the Le-Chatelier method | 5mm | Not More than 10 mm |
| 3 | Standard Consistency | IS-4031 (Part-4) | 27.00% | 25 % to 35 |

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## TEST REPORT

| | |
|---|---|
| Client: | Bruhath Bangalore Mahanagara Palike |
| Project: | Improvements to drains and footpath at Tatanagar from 5th cross to 7th cross and other roads in ward No. 08, Kodigehalli |
| Consultants | TEJUS CONSULTANTS Basaveshwar Nagar Bangalore |
| Contractor: | M/s KRIDL |
| Total Weight in gm: | 3000 |

## SIEVE ANALYSIS

| | | | |
|---|---|---|---|
| Type of Material | 40 mm down size | Proposed Use | PCC |
| Sample Location | At Site/Plant | Date of Sampling | 30.04.2019 |
| | | Date of Testing | 30.04.2019 |

| IS Sieve Size | Weight Retained in gm | Cum. Weight Retained in gm | Cumulative Weight Retained in % | Cumulative Weight Passing in % | Specific Limits as per IS 383-1970 (RA-2007) % of Passing For Graded Aggregate of Nominal Size |
|---|---|---|---|---|---|
| 80.00mm | 0 | 0 | 0.00 | 100.00 | 100 |
| 63.00mm | 0 | 0 | 0.00 | 100.00 | - |
| 40.00mm | 128 | 128 | 4.27 | 95.73 | 95-100 |
| 20.00mm | 1378 | 1506 | 50.20 | 49.80 | 30-70 |
| 10.00mm | 910 | 2416 | 80.53 | 19.47 | 10-35 |
| 4.75mm | 490 | 2906 | 96.87 | 3.13 | 0-5 |
| Pan | 94 | 3000 | 100.00 | 0.00 | |

**Remarks :** Satisfactory / Not Satisfactory

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# TEST REPORT

| | |
|---|---|
| Clients | Bruhat Bangalore Mahanagara Palike |
| Project | Improvements to drains and footpath at Tatanagar from 5th cross to 7th cross and other roads in ward No. 08, Kodigehalli |
| Consultants | Tejus Consultants, Bangalore |
| Contractor | M/s KRIDL |

## SIEVE ANALYSIS

| | | | |
|---|---|---|---|
| Total Weight: | 3000 gms | | |
| Type of Material | Fine aggregate (River Sand/ M sand) | Proposed Use | PCC FOR ROAD |
| Sample Location | At Site/Plant | Date of Sampling | 30.04.2019 |
| | | Date of Testing | 30.04.2019 |

| IS Sieve Size | Weight Retained | Cum. Weight Retained | Cum. % Retained | Cum. % Passing | Spec. Limit (%) Passing (Zone-II) |
|---|---|---|---|---|---|
| 10.00 mm | 0 | 0 | 0 | 100.00 | 100 |
| 4.75 mm | 220 | 220 | 7.33 | 92.67 | 90 - 100 |
| 2.36 mm | 320 | 540 | 18.00 | 82.00 | 75 - 100 |
| 1.18 mm | 310 | 850 | 28.33 | 71.67 | 55 - 90 |
| 0.600 mm | 482 | 1332 | 44.40 | 55.60 | 35 -59 |
| 0.300 mm | 822 | 2154 | 71.80 | 28.20 | 8-30 |
| 0.150 mm | 645 | 2799 | 93.30 | 6.70 | 0 - 10 |
| Pan | 201 | 3000 | | | - |
| | | | | | |

**Remarks :** Satisfactory / Not Satisfactory

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## TEST REPORT

| | |
|---|---|
| Clients | BRUHAT BENGALORE MAHANAGARA PALIKE |
| Project | Improvements to drains and footpath at Tatanagar from 5th cross to 7th cross and other roads in ward No. 08, Kodigehalli |
| Consultants | TEJUS CONSULTANTS Basaveshwar Nagar Bangalore |
| Contractor | M/s KRIDL |

## SPECIFIC GRAVITY AND WATER ABSORPTION

### FINE AGGREGATE (IS-2386-PART-3)

| | | | |
|---|---|---|---|
| Type of Material | Fine aggregate (River Sand/ M sand) | Proposed Use | PCC FOR ROAD |
| Location/Source | At Site/Plant | Date of Sampling | 30.04.2019 |
| Period of Soaking | 24 hours | Date of Testing | 30.04.2019 |

| Sl. No. | Test Property | TRIAL - 1 | TRIAL - 2 | TRIAL - 3 | |
|---|---|---|---|---|---|
| A | Weight of sturated surface dry sample gm. | 668 | 642 | 690 | |
| B | Weight of oven - dry sample gm. | 658 | 634 | 682 | |
| C | Weight of Pycnometer Filled with water gm | 1275 | 1275 | 1275 | |
| D | Weight of Pycnometer + sample + water gm | 1696 | 1678 | 1708 | |
| E | Bulk specific gravity $\frac{B}{(C+A-D)}$ | 2.664 | 2.653 | 2.654 | 2.657 |
| G | Absorption (%) $\frac{(A-B)*100}{B}$ | 1.520 | 1.262 | 1.173 | 1.318 |

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